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HIDS 505  
Assignment 10 - CMS Blue Button

## Step 1: Join the Developer Sandbox

App Details - Required Info

Application Name

appTestJF

OAuth - Client Type

Confidential

Authorization Grant Type\*

Authorization code

Callback URLs / Redirect URIs

http://localhost:3000

Does your application need to collect beneficiary demographic information (Name, address, date of birth, race, and gender)?

Yes

No

An official website of the United States government [Here's how you know](#)

Blue Button 2.0 Sandbox Documentation Support API Docs Test Client Account Logout

SAMPLE API CALL

Below is a sample call for an application to allow a beneficiary to log in with their Medicare.gov account credentials and authorize access to their data.

API version: v1

Authorization Link

[https://sandbox.bluebutton.cms.gov/v1/o/authorize?response\\_type=code&client\\_id=9FTkjlaFygjcy4KAqxRZoI](https://sandbox.bluebutton.cms.gov/v1/o/authorize?response_type=code&client_id=9FTkjlaFygjcy4KAqxRZoI)

You'll need sample beneficiary credentials to log in

The first user is **BBUser0000** with password **PW00000!** and these sample users continue all the way to **BBUser29999** with password **PW29999!**  
Note: the ! at the end of the password is required

Authorize as a Beneficiary

## Step 2: Test Client

The screenshot shows a web browser window with the URL [medicare.gov](https://medicare.gov) in the address bar. The page has a dark blue header with the text "See how Medicare is responding to Coronavirus" and a "Learn more" button. Below the header, there are two main sections: "Log in" on the left and "Create an account" on the right. The "Log in" section contains fields for "USERNAME" (BBUser0000) and "PASSWORD" (with a "Show" link). There is also a checkbox for saving the username and a link for "What's this?". The "Create an account" section lists benefits like getting a summary of coverage, adding drugs & pharmacies, and comparing plan costs. A "Create Account" button is at the bottom. A "Feedback" link is located on the far right.

The screenshot shows a modal dialog box from "Medicare.gov" asking for permission to access data. The title is "TestApp has asked for some of your data." It lists three types of information: doctor/hospital visits, prescription medications, and personal details. Under "Privacy Options", there are two radio button choices: "Share all of your data" (selected) and "Share healthcare data, but not your personal info". Below this, a section titled "Understand how your data is being used" provides a link to the app's Privacy Policy and Terms and Conditions. At the bottom are "Allow" and "Deny" buttons. A footer note says "You can revoke this app's access to your data at any time by logging into your Medicare.gov account or calling us at...".

The screenshot shows a web browser window with the URL [sandbox.bluebutton.cms.gov](https://sandbox.bluebutton.cms.gov) in the address bar. The page content is as follows:

**API version: v1**

**Step 1: Sample Authorization**

Success! You have a token. Now you can make API calls below. Or you can [repeat this step if you need a new token](#), or [restart testclient](#)

```
{'access_token': 'NU48UlbEf0C10gTjk208I7wyQoSKCF', 'expires_in': 36000, 'token_type': 'Bearer', 'scope': ['patient/Coverage.read', 'patient/ExplanationOfBenefit.read', 'patient/Patient.read', 'profile'], 'refresh_token': '4yb0pC6uToeisBbL8YoDLzojKlsJLtw', 'patient': '-19990000000001', 'expires_at': 1681380997.1593235}
```

**Step 2: API Calls**

Once you've completed step one and have an authorization token, you can click on any of the links below to simulate calls to different endpoints and see the sample data that is delivered in the response.

- [ExplanationOfBenefit](#)
- [Patient](#)
- [Coverage](#)
- [Profile \(OIDC Userinfo\)](#)
- [FHIR Metadata \(No Token Needed\)](#)
- [OIDC Discovery \(No Token Needed\)](#)

**Additional Resources**

If you need more information about the API or the sample data, feel free to read our [developer documentation](#).

**Testing your own application:**

If you want to test the Blue Button 2.0 API with your own application, create a Sandbox account and register your application. Once registered, you can use your test credentials to re-create this experience and include synthetic Medicare data in your own application.

[Create a Sandbox Account](#)

The screenshot shows a web browser window with the URL [sandbox.bluebutton.cms.gov](https://sandbox.bluebutton.cms.gov) in the address bar. The page content is as follows:

**GET /v1/fhir/metadata**

**Parameters**

No parameters

**Responses**

**Curl**

```
curl -X 'GET' \
  'https://sandbox.bluebutton.cms.gov/v1/fhir/metadata' \
  -H 'accept: application/json'
```

**Request URL**

```
https://sandbox.bluebutton.cms.gov/v1/fhir/metadata
```

**Server response**

**Code**    **Details**

200    Response body

```
{
  "resourceType": "CapabilityStatement",
  "status": "active",
  "date": "2023-04-16T18:27:25-04:00",
  "publisher": "Centers for Medicare & Medicaid Services",
  "kind": "instance",
  "software": {
    "name": "Blue Button API: Direct",
    "version": "1.0.0-SNAPSHOT"
  },
  "implementation": {
    "description": "gov.cms.bfd:bfd-server-war",
    "url": "https://prod-sbx.bfd.cms.gov/v1/fhir"
  },
  "fhirVersion": "3.0.2",
  "jurisdiction": [
    "US"
  ],
  "contact": [
    {
      "name": "Centers for Medicare & Medicaid Services"
    }
  ],
  "language": "en-US",
  "conformance": [
    "http://hl7.org/fhir/StructureDefinition/capabilitystatement-terminology"
  ],
  "rest": [
    {
      "mode": "full",
      "interaction": [
        "read",
        "search",
        "update",
        "patch"
      ],
      "resource": [
        "Patient"
      ]
    }
  ],
  "security": {
    "system": [
      {
        "name": "OpenID Connect"
      }
    ],
    "requirement": [
      "http://hl7.org/fhir/StructureDefinition/capabilitystatement-security-1"
    ]
  }
}
```

### Step 3: Call the API

- Using Beneficiary ID: 20140000004807 (Username: BBUser24806, Password: PW24806!)

The screenshot shows the Postman application interface. In the center, there is a configuration panel for a GET request to <https://sandbox.bluebutton.cms.gov/v1/fhir/Patient/>. The 'Authorization' tab is selected, showing the 'Configure New Token' dialog. The 'Type' dropdown is set to 'OAuth ...'. The 'Token Name' is 'appTestJF3', 'Grant Type' is 'Authorization Code', 'Callback URL' is 'http://localhost:3000', 'Auth URL' is 'https://sandbox.bluebutton.cms.gov/v1/o/auth', 'Access Token URL' is 'https://sandbox.bluebutton.cms.gov/v1/o/token', 'Client ID' is 'cVknvSWUT1zpnFXN7AYpZwQfza6RCG', and 'Client Secret' is 'Rwe3OnIJ2RahMoC0QCIGQa9MPefQIW'. Below the configuration, the 'Body' tab is selected, showing a JSON response structure. The status bar at the bottom indicates a 200 OK response with 180 ms and 1.68 KB.

The screenshot shows the Postman application interface. A modal window titled 'MANAGE ACCESS TOKENS' is open, listing three tokens: 'appTestJF1', 'appTestJF2', and 'appTestJF3'. The 'appTestJF3' token is selected. The 'Token Details' section shows the token's properties: Token Name (appTestJF3), Access Token (Y377VXPfDTYdwstYOt6jQGNobaNYVm), Token Type (Bearer), expires\_in (36000), scope (patient/Patient.read patient/Coverage.read patient/ExplanationOfBenefit.read profile), refresh\_token (GW9UzeJvh60tsItfMvoTrDc94qGI), patient (-20140000004807), and access\_token\_url (<https://sandbox.bluebutton.cms.gov/v1/o/token/>). The 'Use Token' button is highlighted. Below the modal, the main Postman interface shows a 403 Forbidden response with the message 'detail': "You do not have permission to perform this action." The status bar at the bottom indicates a 403 Forbidden response with 110 ms and 610 B.

The JSON file produced includes information regarding patient, coverage, and explanation of benefits. Initially when testing out the process of API calls, I only used the scope of patient/Patient.read, but once I understood the steps I used patient/Patient.read, patient/Coverage.read, and patient/ExplanationOfBenefits.read profile. Please find the downloaded/saved JSON files also submitted with this assignment.

Patient:

The screenshot shows the Postman application interface. The left sidebar displays collections, APIs, environments, mock servers, monitors, flows, and history. A collection named "HIDS505\_Assignment10" is selected, containing a folder "My first collection" with two sub-folders: "First folder inside collection" and "Second folder inside collection".

The main workspace shows a GET request to <https://sandbox.bluebutton.cms.gov/v1/fhir/Patient/>. The request has the following Headers:

Key	Value	Description
Authorization	Bearer Y377VXPIDTYdwstY0t6jQGNobaN...	
Cookie	sessionid=bc7bt6mhqv1ec1714k1g6cmhe...	
Postman-Token	<calculated when request is sent>	
Host	<calculated when request is sent>	
User-Agent	PostmanRuntime/7.32.2	
Accept	*/*	
Accept-Encoding	gzip, deflate, br	
Connection	keep-alive	

The response body is a JSON object:

```
{
  "url": "https://bluebutton.cms.gov/resources/variables/dual_08",
  "valueCoding": {
    "system": "https://bluebutton.cms.gov/resources/variables/dual_08",
    "code": "AA"
  }
}
```

## Coverage:

The screenshot shows the Postman application interface. On the left, there's a sidebar with options like Collections, APIs, Environments, Mock Servers, Monitors, Flows, and History. The main area displays a collection named "HIDS505\_Assignment10". Inside this collection, there are two folders: "First folder inside collection" and "Second folder inside collection", each containing a single GET request. The "Second folder inside collection" has a tooltip: "Create a collection for your requests. A collection lets you group related requests and easily set common authorization, tests, scripts, and variables for all requests in it." Below this, there are buttons for "Create Collection" or "Use a Template". The central part of the screen shows a detailed view of a GET request to "https://sandbox.bluebutton.cms.gov/v1/fhir/Coverage/". The "Body" tab is selected, displaying a JSON response with 23 numbered lines. The response is a searchset with a total of 4 entries, each with a relation (first, last, self) and a URL. The "Send" button is visible at the top right of the request details.

```
1 "resourceType": "Bundle",
2 "id": "214c0fd9-c47d-4bb6-b143-3d55420722d3",
3 "meta": {
4     "lastUpdated": "2022-02-14T17:27:56.303-05:00"
5 },
6 "type": "searchset",
7 "total": 4,
8 "link": [
9     {
10         "relation": "first",
11         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/Coverage?_format=application%2Fjson%2Bfhir&_startIndex=0&_count=10&beneficiary=Patient%2F-20140000004807"
12     },
13     {
14         "relation": "last",
15         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/Coverage?_format=application%2Fjson%2Bfhir&_startIndex=0&_count=10&beneficiary=Patient%2F-20140000004807"
16     },
17     {
18         "relation": "self",
19         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/Coverage/?_count=10&_format=application%2Fjson%2Bfhir&beneficiary=Patient%2F-20140000004807&_startIndex=0"
20     }
21 ],
22 "entry": [
```

## Explanation of Benefit:

This screenshot is similar to the previous one but shows a different API endpoint. The collection "HIDS505\_Assignment10" contains two folders, and the "Second folder inside collection" has a tooltip about creating collections. The main request is a GET to "https://sandbox.bluebutton.cms.gov/v1/fhir/ExplanationOfBenefit/". The "Body" tab shows a JSON response with 23 numbered lines. This response is also a searchset with a total of 546 entries, including links for first, last, and self, along with their respective URLs. The "Send" button is present at the top right.

```
1 "resourceType": "Bundle",
2 "id": "610f0d03f-569a-448e-b0d1-f58550da4708",
3 "meta": {
4     "lastUpdated": "2022-02-14T17:27:56.303-05:00"
5 },
6 "type": "searchset",
7 "total": 546,
8 "link": [
9     {
10         "relation": "first",
11         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/ExplanationOfBenefit?_format=application%2Fjson%2Bfhir&_startIndex=0&_count=10&patient=-20140000004807"
12     },
13     {
14         "relation": "next",
15         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/ExplanationOfBenefit?_format=application%2Fjson%2Bfhir&_startIndex=10&_count=10&patient=-20140000004807"
16     },
17     {
18         "relation": "last",
19         "url": "https://sandbox.bluebutton.cms.gov/v1/fhir/ExplanationOfBenefit?_format=application%2Fjson%2Bfhir&_startIndex=540&_count=10&patient=-20140000004807"
20     },
21     {
22         "relation": "self",
23     }
24 ]
```